

# Chapter 10 LEVELS

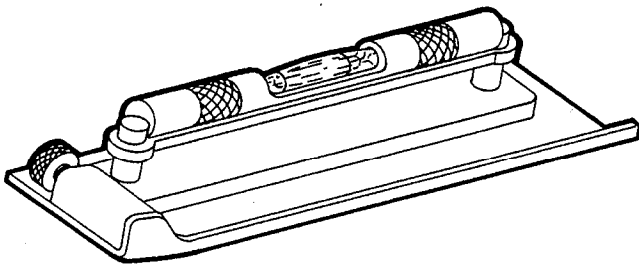
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## HOW TO CHOOSE AND USE THEM

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The "Types and Uses" section provides you with a list of types of levels. These pages should help you select the right level for the job.

The "Using Levels" section tells you how to use levels for their various functions (plumbing, leveling, etc).



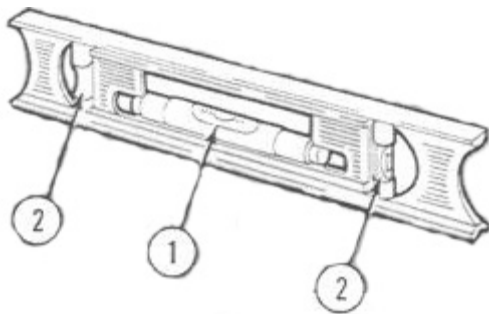
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## TYPES AND USES

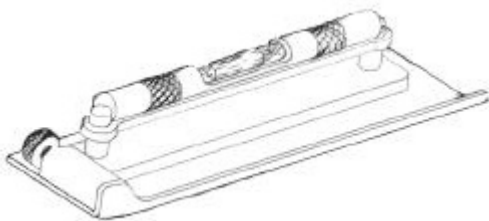
Levels are tools designed to prove whether a plane or surface is in the true vertical or true horizontal. All levels consist of a liquid-filled glass tube or tubes supported in a frame.

### MASTER PRECISION LEVEL



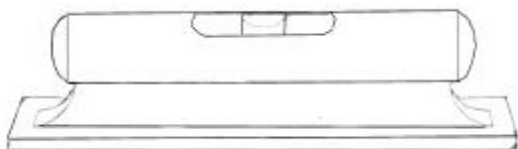
The master precision level has a ground and graduated main vial (1). The top and bottom of the level are milled and ground to make sure both surfaces are absolutely parallel. This level is used to determine the true horizontal with the main vial (1). The true vertical is determined by using the two smaller vials (2).

### MACHINIST'S LEVEL



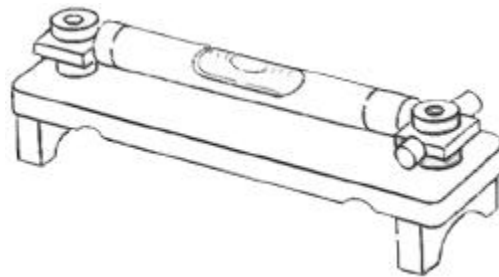
The machinists level has an extra large vial. This increases its accuracy and sensitivity. Some of these levels have grooved bottoms which fit over pipes and shafts. They are used in machine shops for leveling work and equipment.

### IRON BENCH LEVEL



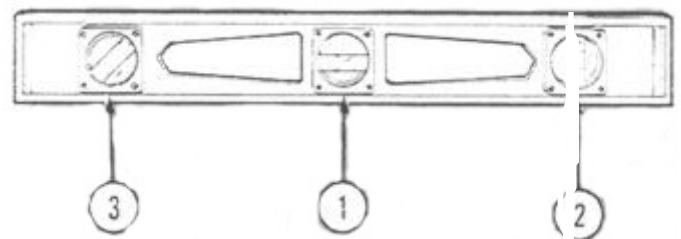
The iron bench level is made of a special design casting which insures its lightness, strength, and rigidity. It is used mostly in the construction industry. It may also be used in a machine shop.

### STRIDING LEVEL

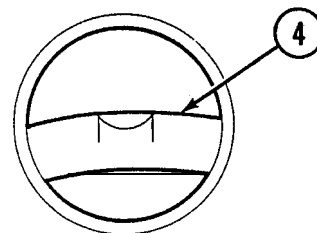


The striding level is a machinist's level which is mounted on a raised base. This level is used to span existing cabling, piping, or similar obstructions. It is extremely useful in a machine shop for checking the true horizontal of the flatway on a lathe.

### CARPENTER'S LEVEL

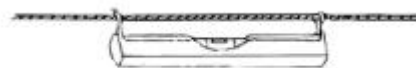


The carpenter's level has three vials which are mounted horizontally (1) vertically (2) and at a 45 degree angle (3). The carpenter's level is used in construction for checking for true vertical, true horizontal, and 45 degree angles.



Some levels have a bent tube (4) which allows the bubble to settle quickly.

### LINE LEVEL

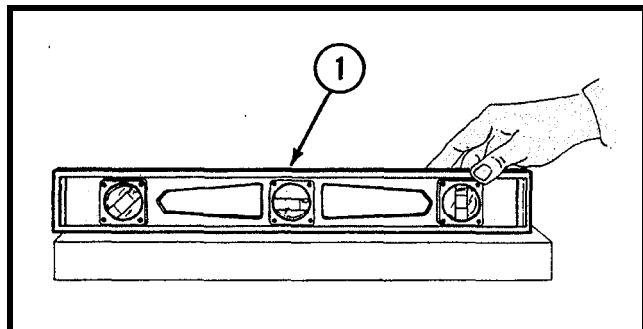


The line level is a single vial in a metal case with a hook on each end for hanging on a cord. It is used to check whether two points are level, such as two points on a floor or in an elevation. It must be used with a tightly stretched cord.

## USING A LEVEL

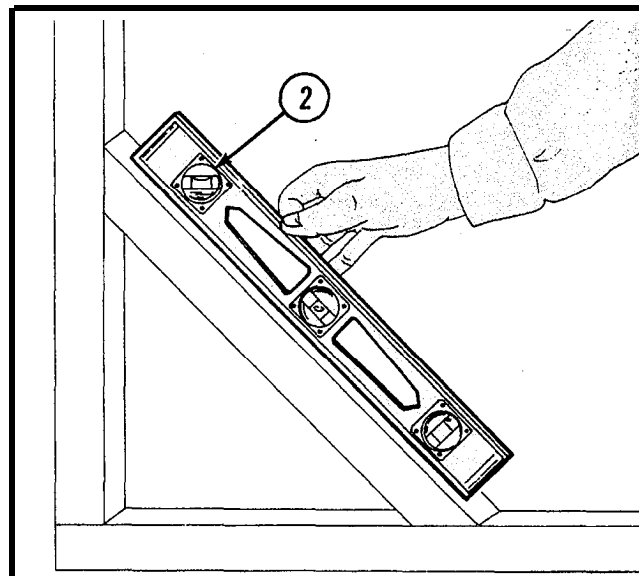
A level may be checked for accuracy by placing it on a known level surface and noting the position of the bubble. Reverse the level end for end. Observe the position of the bubble. If the relative position of the bubble was the same for both readings, the level is accurate.

### HORIZONTAL SURFACE



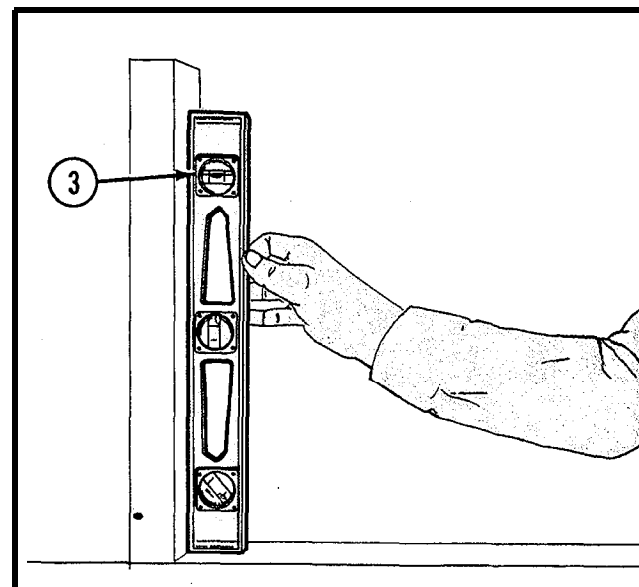
Place the level on a flat horizontal surface. Check the horizontal vial (1). The bubble should be between the two etched lines on the vial. If it is not, the surface is not horizontal.

### ANGLED SURFACE



Place the level on an angled surface. If the angle is 45 degrees, the bubble will appear between the notched lines on the 45 degree vial (2).

### VERTICAL SURFACE



Place the level against a flat vertical surface. Check the vertical vial (3). The bubble should be between the two etched lines on the vial. If it is not, the surface is not vertical.

